10/522515

DT01 Rec'd PCT/PTO 27 JAN 2005

SPECIFICATION AMENDMENTS

Please amend the paragraph that begins on line 26 on page 17 as follows:

Thus, for the case of a matrix with fixed coefficients and a variable gain controlled by a scale factor at each matrix output, the signal output at each of the five output channels is (where "SF" is a scale factor for a particular output identified by the subscript):

Lout = Lt(SF_L)

MidLout = ((.92)Lt + (.38) Rt)) SF_{MidL})

~~Cout = ((.45) Lt + (.45) Rt)) (SF_C)~~

Cout = ((.71)Lt + (.71) Rt))(SF_C)

MidRout + ((.38)Lt+(.92)Lt))(SF_{MidR})

Rout + Rt(SF_R)

Please amend the paragraph that begins on line 24 and 25 on page 21 as follows:

Continuing with the description of FIG.2, modules 24-34 receive appropriate ones of the six inputs 1',3',5',9',13' and 23' in the manner shown in FIG.1. Each module generates a preliminary scale factor ("PSF") output for each of the audio output channels associated with it as shown in FIG.1. Thus, for example, module 24 receives inputs 1' and 3' and generates preliminary scale factor outputs PSF1, PSF2 and PSF3. Alternatively, as mentioned above, each module may generate a preliminary set of audio outputs for each of the audio output channels associated with it. Each module also may communicate with a supervisor 201, as explained further below. Information sent from the supervisor 201 to various modules may include neighbor level information and higher-order neighbor level information, if any. Information sent to the supervisor from each module may include the total estimated energy of ~~interior~~ the interior outputs attributable to each of the module's inputs. The modules may be considered part of a control-signal-generating[[-]]portion of the overall system of FIG.2.

Please amend the paragraph that begins on line 16 on page 24 as follows

Because the levels are energy levels (a second-order quantity), as opposed to amplitudes (a first-order quantity), after the divide operation, a square-root operation is applied in order to obtain the final scale factor (scale factors are associated with first-order quantities). The addition of the interior levels and subtraction from the total input level are all performed in a pure energy sense,

because interior outputs of different module interiors are assumed to be independent (uncorrelated). If this assumption is not true in an unusual situation, the calculation may yield more leftover signal at the input than there should be, which may cause a slight spatial distortion in the reproduced soundfield (*e.g.*, a slight pulling of other nearby interior images toward the input), but in the same situation, the human ear likely reacts similarly. The interior output channel scale factors, such as PSF6 through ~~PSF 8~~ PSF8 of module 26, are passed on by the supervisor as final scale factors (they are not modified). For simplicity, FIG. 3 only shows the generation of one of the endpoint final scale factors. Other endpoint final scale factors may be derived in a similar manner.

Please amend the paragraph that beings on line 3 on page 26 as follows:

FIGS. 4A-4C show a functional block diagram of a module according to an aspect of ~~to~~ the present invention. The module receives two or more input signal streams from a supervisor, such as the supervisor 201 of FIG. 2. Each input comprises an ensemble of complex-valued frequency-domain transform bins. Each input, 1 through m, is applied to a function or device (such as function or device 401 for input 1 and function or device 403 for input m) that calculates the energy of each bin, which is the sum of the squares of the real and imaginary values of each transform bin (only the paths for two inputs, 1 and m, are shown to simplify the drawing). Each of the inputs is also applied to a function or device 405 that calculates the common energy of each bin across the module's input channels. In the case of an FFT embodiment, this may be calculated by taking the cross product of the input samples (in the case of two inputs, L and R, for example, the real part of the complex product of the complex L bin value and the complex conjugate of the complex R bin value). Embodiments using real values need only cross-multiply the real value for each input. For more than two inputs, the special cross-multiplication technique described below may be employed, namely, if all the signs are the same, the product is given a positive sign, else it is given a negative sign and scaled by the ratio of the number of possible positive results (always two: they are either all positive or all negative) to the number of possible negative results.